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United States Department of the Interior
Fish and Wildlife Service

Fishery Leaflet 59

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PACIFIC OCEANIC FISHERY
INVESTIGATIONS

Chicago 54, Ill. * October 1946

CONSTRUCTION OF A GARDEN FISH POOL [1]

Prepared in the Division of Game Fish and Hatcheries

Whether a pool is constructed in a formal or an informal landscape setting the builder will desire it to be of a permanent nature. If water lilies are to be grown, the pond should be about two feet deep, at least three feet wide and long for the smaller varieties, and six feet for the larger ones. It is assumed that fishes will be removed during the winter in regions where thick ice forms over the surface.

PREPARATION OF THE SITE

The sides and bottom of the excavation should be cut smooth and curved to the desired dimensions and contour, allowing six inches for the thickness of the concrete. Pools should rest on well-compacted soil to lessen uneven settling. Construction should be avoided on filled ground whenever other space is available.

WATER SUPPLY

Water may be supplied through a pipe connected with the local water supply. This intake pipe may come in over or through the side of the pool, or through the floor. The drain should be placed at the lowest point in order to get complete drainage. A coupling should be provided in the outlet to the drain line which is embedded in the concrete bottom. These are installed before the concrete is poured. A piece of pipe of the correct length to regulate the depth of the water by flow into its upper end is screwed into the coupling. A screen may be placed over the overflow pipe to prevent clogging and the escape of fish. To drain the pool, the overflow pipe is unscrewed and removed. For permanence, all plumbing fixtures should be of a non-rusting type. If the topography does not permit drainage into a ravine, the water may be drained into a stone pit. The pit may be constructed at a convenient place near the pool by digging a hole below the level of the pool bottom in which are placed stones 3 to 6 inches in diameter. The amount of stone needed will vary with the volume of the pool and the porosity of the soil. Three to five cubic yards of stone should be adequate for a pool with a volume of 150 cubic feet of water. The drain pipe is terminated in the middle upper level of the stones and the latter covered with soil. Drainage will be more rapid if there is considerable fall between the bottom of the pool and the drain outlet.

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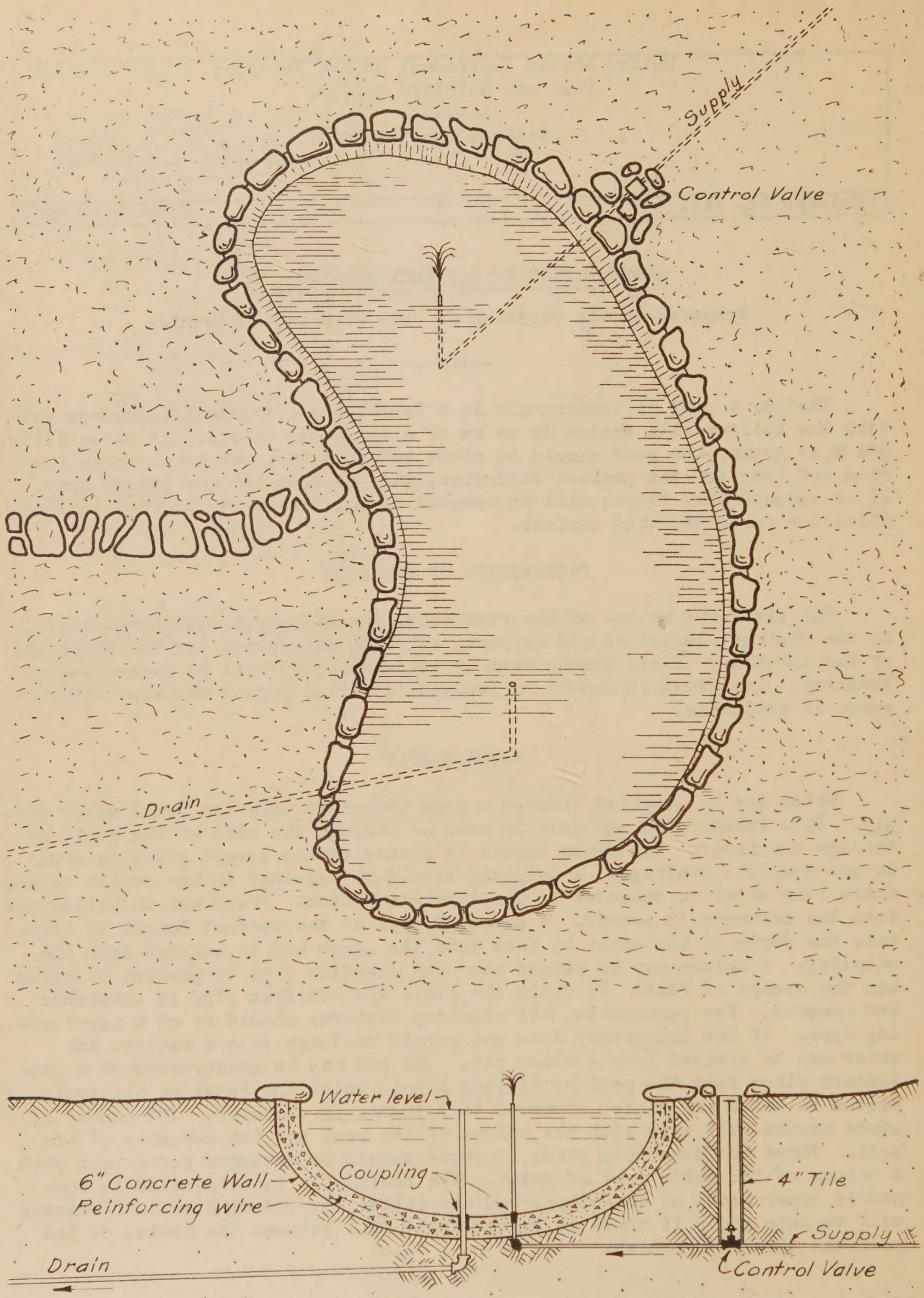
[1] Supersedes Memorandum I-41, issued by the former Bureau of Fisheries.


Supply
Control Valve
Drain
Water level
6" Concrete Wall
Reinforcing wire
Coupling
4" Tile
Supply
Drain
Control Valve

FORMS FOR THE CONCRETE

If the slope of the sides is not steeper than one foot in height to every two feet in horizontal distance, no forms will be needed for the inside wall. When the soil is firm, no outside forms will be required except for those portions of the pool wall above the ground line. If the earth is loose or the walls are steeper than indicated above, both inner and outer forms will be necessary. Forms are ordinarily made of wood. For curved parts, twenty-gauge galvanized iron makes a flexible and very satisfactory form. Forms should be tight to avoid leakage of cement and strong enough to support the weight of the concrete and additional loads incident to construction without sagging or bulging. Forms may be removed in about 48 hours. Removal can be facilitated by oiling the inside surface of the forms before the concrete is poured.

REINFORCING THE CONCRETE

Any available woven wire or pieces of steel will be satisfactory for reinforcing. It is recommended that reinforcing materials be used at the rate of 80 pounds per cubic yard of concrete. The distance of overlap of the ends of the reinforcing material should be approximately 40 times its diameter. The reinforcing material should be bent to conform to the angle at the corners and to fit the curves. It should be laid, and wired in place if necessary, so that about two inches of concrete lies outside it.

MIXING AND POURING CONCRETE

The concrete mixture recommended is made up in the ratio of one sack of Portland cement to 2¼ cu. ft. of sand to 3 cu. ft. of clean, hard gravel or crushed stone, with not more than 5 gallons of water added per sack of cement, if damp sand is used. If the sand is dry, use 5½ gallons and if the sand is very wet use 4 gallons of water per sack of cement 2/. Concrete should be thoroughly mixed until it is uniform in color and consistency. It should be poured in layers of approximately six inches and tamped with a spade. Care should be taken that the reinforcing materials are not displaced. The pouring of the concrete should proceed continuously until completed. If natural rocks are to be used on the top and upper part of the wall, they should be set in the concrete before it has hardened. If no forms are used, the cement should be covered with burlap and kept wet for 7 days.

PREPARATION OF THE POOL FOR USE

New concrete is strongly alkaline and toxic to fish. When the pool has been completed, it should be flushed out thoroughly, filled with water, and let stand for three or four days. It may then be drained and filled with fresh water. Two or three days later, the pool should be tested by putting in one or two fish. If they survive, remove them, place two inches of sand in the bottom of the pool, plant the desired vegetation, and refill with water. After three or four days the full quota of fish may be introduced.

2/ Publication P-172, the Portland Cement Association, 33 W. Grand Ave., Chicago 10, Illinois.

Anacharis (*Anacharis canadensis*) and fanworth (*Cabomba caroliniana*) are excellent plants for garden pools. These and other plants are obtainable from most goldfish and aquarium dealers or from their natural habitat in lakes and ponds.

REFERENCES

Care of Goldfish. Fishery Leaflet 57. Mimeographed, 6 pp. Obtainable from the Fish and Wildlife Service, Chicago 54, Illinois.

Care of Aquarium Fishes. Fishery Leaflet 43. Mimeographed, 7 pp. Fish and Wildlife Service, Chicago 54, Illinois.

Some Tropical Aquarium Fishes. Fishery Leaflet 185. Mimeographed, 15 pp. Fish and Wildlife Service, Department of the Interior, Chicago 54, Illinois.

Exotic Aquarium Fishes. By Wm. T. Innes. 507 pp. Price $6.00, Innes Publishing Co., Philadelphia, Pa.